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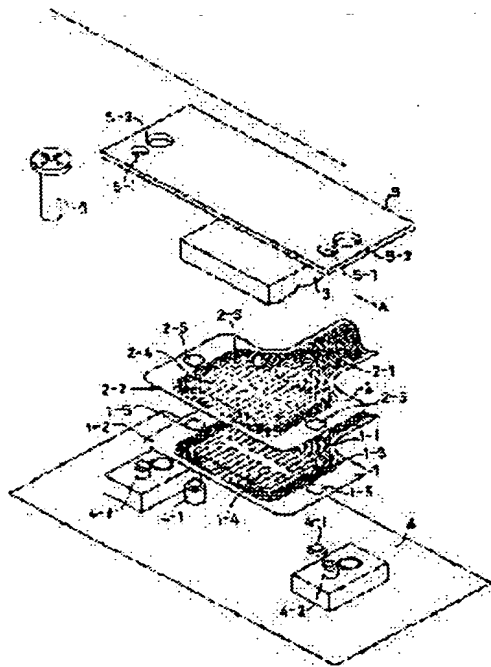
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(21)Application number : 08-230330 (71)Applicant : CANON INC

(22)Date of filing : 30.08.1996 (72)Inventor : YASUMARU ICHIRO

(54) CONNECTOR



(57)Abstract:

PROBLEM TO BE SOLVED: To provide a connector which enables electrical conductivity by assuring a contact between wiring patterns.
SOLUTION: Flexible printed boards 1 and 2, or the flexible printed board and a pressure-contact connection part thereof are covered with an elastic pressing member 3 formed of elastic material. The elastic pressing member 3 is elastically deformed by the presence of keeping members 4, 5 and 6 to generate pressing force in the pressure-contact connection part. A pressing surface is formed between the elastic pressing member 3 and the pressure- contact connection part elastically deformed by the generation of the definite pressing force so as to uniformly distribute weight therein.

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CLAIMS

[Claim(s)]

[Claim 1] It is the connector which has the elastic press member formed by the elastic member assigned to flexible printed circuit boards or the pressure-welding connection of a flexible printed circuit board and a printed circuit board, and the presser-foot member which is made to carry out elastic deformation of said elastic press member, and gives thrust to this pressure-welding connection, and is characterized by forming said elastic press member so that a press side with said pressure-welding connection which predetermined thrust was given and carried out elastic deformation may turn into a uniform load side.

[Claim 2] Said elastic press member is a connector characterized by the press side being formed by the point of an elastic press member body in claim 1 convex.

[Claim 3] Said elastic press member is a connector characterized by on the whole a press side forming the heights of an arc configuration in claim 1 at the point of an elastic press member body.

[Claim 4] It is the connector characterized by having formed the press side bordering on the crevice where said elastic press member was prepared in the contact side in claims 1 or 2, and being formed so that one of press sides may become smaller than the width of face into which the pressure-welding side of the divided press side was divided at least.

[Claim 5] It is the connector characterized by having formed the press side bordering on the crevice where said elastic press member was prepared in the contact side in claims 1 or 2, and forming heights, such as R configuration, in the location corresponding to a center section of the circuit pattern by which a pressure welding is carried out to one of press sides mostly at least.

[Claim 6] It is the connector characterized by forming said elastic press member by the rubber member in claims 1, 2, 3, 4, or 5.

[Claim 7] It is the connector which is the almost same magnitude as opening of the cover-lay film of a flexible printed circuit board with which pressure-welding connection of the press side of said elastic press member is made in claims 1, 2, 3, 4, 5, or 6, and is characterized by being formed in R configuration of a longitudinal direction which makes a core top-most vertices mostly.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is a connector used for electronic equipment, such as a camera, and relates to the connector for connecting the circuit pattern of other flexible printed circuit boards or a printed circuit board to two or more circuit patterns of especially a flexible printed circuit board.

[0002]

[Description of the Prior Art] Conventionally, as an approach of connecting two or more circuit patterns of a hard printed circuit board with flexible printed circuit boards (it being described as Following FPC), or FPC, there is an approach linked to for example making elastic members, such as silicone rubber, press, and it is shown in drawing 7 as a conventional example. Drawing 7 is a sectional view showing the condition when connecting the circuit pattern of FPC.

[0003] In this drawing, the pressure plate with which in the body of a camera and 32 the 2nd FPC and 34 press connection rubber and, as for 35, the 1st FPC and 33 press [31] connection rubber 34, and 36 are screws. Two or more circuit patterns 32-1 and 33-1 are formed in the 1st FPC 32 and 2nd FPC 33 which are arranged on the body 31 of a camera, respectively. It is tidily arranged so that each circuit patterns may be connected. Besides, the connection rubber 34 set as magnitude which covers completely the field where 33-1 is connected with these circuit patterns 32-1 is arranged in the section. By putting the pressure plate 35 set up so that this connection rubber 34 might be made to stop and press, and drawing this pressure plate 35 in the body 31 of a camera on a screw 36, connection rubber 34 is compressed and connects a circuit pattern.

[0004] Moreover, when making a circuit pattern 32-1 and 33-1 press, connection rubber 34 is pressed in respect of [34-1] a flat surface, as 33-1 is completely indicated to be a circuit pattern 32-1 with a wrap to drawing 8 which is cross-section C-C'.

[0005] The crevice 34-2 which the flat-surface section is formed in connection rubber 34 to the field which presses circuit patterns since it is arranged so that the circuit pattern 32-1 shown in drawing 8 and 33-1 may become the circuit pattern of this pressure-welding section which became independent right and left from the center section mostly and it may face each other, meets that center section by the circuit pattern section, and is pushed is formed.

[0006]

[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional example, since it was used compressing the silicone rubber which is an elastic body, there were the following faults.

[0007] Although it is necessary to manage the deformation used as the amount of

crushing of silicone rubber when contact pressure of each circuit pattern to connect tends to be made into homogeneity and it is going to make the 1st flow through it completely first. By the repulsive force when pressing down because the distance from the bis-stop section of 36 changes, and pressing down by the member 35 changing, and pushing in respect of a flat surface, the repulsive force of silicone rubber is puffed up and the contact pressure of a core and an edge changes. the core and edge of a circuit pattern which were arranged by juxtaposition show to drawing 7 -- bis--- The defective continuity of the circuit pattern which is going to make pressure-welding connection occurs.

[0008] Moreover, when pressing down and compressing silicone rubber with the pressure plate 35, this compressive force is that the pressure-welding side of FPC will become an ununiformity with a cover-lay film, adhesives, etc. if the contact pressure of a circuit pattern core and an edge tends to change by escaping to the longitudinal direction this force of whose is a direction which intersects perpendicularly, for example, it is going to carry out the pressure welding of FPC of three or more sheets with connection rubber in addition to the force to the direction in which it is going to contact circuit patterns, and it is easy to generate the defective continuity of a circuit pattern.

[0009] The purpose of invention concerning this application is to offer the connector which can ensure contact of circuit patterns and can aim at an electric flow.

[0010]

[Means for Solving the Problem] The 1st configuration which realizes the purpose of invention concerning this application Flexible printed circuit boards or the elastic press member formed by the elastic member assigned to the pressure-welding connection of a flexible printed circuit board and a printed circuit board, It has the presser-foot member which is made to carry out elastic deformation of said elastic press member, and gives thrust to this pressure-welding connection, and said elastic press member is in the connector characterized by forming so that a press side with said pressure-welding connection which predetermined thrust was given and carried out elastic deformation may turn into a uniform load side.

[0011] The 2nd configuration which realizes the purpose of invention concerning this application has said elastic press member in the connector characterized by forming the press side in the point of an elastic press member body convex in the 1st above-mentioned configuration.

[0012] The 3rd configuration which realizes the purpose of invention concerning this application has said elastic press member in the connector characterized by on the whole a press side forming the heights of an arc configuration in the point of an elastic press member body in the 1st above-mentioned configuration.

[0013] The 4th configuration which realizes the purpose of invention concerning this application In the 1st or 2nd above-mentioned configuration said elastic press member It is in the connector characterized by having formed the press side bordering on the crevice established in the contact side, and being formed so that one of press sides may become smaller than the width of face into which the pressure-welding side of the divided press side was divided at least.

[0014] The 5th configuration which realizes the purpose of invention concerning this application has said elastic press member in the connector characterized by to have formed the press side bordering on the crevice established in the contact side, and to form heights, such as R configuration, in the location corresponding to a center section

of the circuit pattern by which a pressure welding is carried out to one of press sides mostly at least in the 1st or 2nd above-mentioned configuration.

[0015] The 6th configuration which realizes the purpose of invention concerning this application has said elastic press member in the connector characterized by forming by the rubber member in each above-mentioned configuration.

[0016] In each above-mentioned configuration, the press side of said elastic press member is the almost same magnitude as opening of the cover-lay film of the flexible printed circuit board by which pressure-welding connection is made, and the 7th configuration which realizes the purpose of invention concerning this application has it in the connector characterized by being formed in R configuration of a longitudinal direction which makes a core top-most vertices mostly.

[0017] In the above-mentioned configuration, since a field which carries out point contact is constituted by the contact section like a lobe, when the deformation press of the connection rubber is carried out in a presser-foot member, and said point contact side or lobe contacts a circuit pattern and exceeds a certain fixed deformation first, the press side of the connection rubber as an elastic press member which pushes FPC or a hard printed circuit board operates so that it may deform and the periphery of the contact surface of this connection rubber may compress. Thereby, circuit patterns tend to carry out point contact of the part which pushes a circuit pattern first, the certainty of a flow improves and it is that it can be flowed through the push pressure of a presser-foot member at least.

[0018] Moreover, the press side of the connection rubber as an elastic press member which pushes FPC or a hard printed circuit board Since the core of the longitudinal direction of connection rubber is made into top-most vertices and the Rth page is formed Because it is near [in which a press member is attached] the bis-**** as an edge is approached while a pressure is applied to a circuit pattern one by one from a core when connection rubber is made to deform in a presser-foot member The pressure of a presser-foot member increases, the force of a core and an edge can be balanced, it becomes possible to push circuit patterns on homogeneity, and the certainty of a flow improves.

[0019]

[Embodiment of the Invention]

(Gestalt of the 1st operation) From drawing 1 , drawing 3 shows the gestalt of operation of the 1st of this invention, and is **. In these drawings, as for the 2nd FPC and 3, the 1st FPC and 2 are [connection rubber and 4] the bodies of a camera, and 1 shows the part in drawing. It is the screw on which 5 stops these components to a pressure plate, and 6 stops them on the body of a camera.

[0020] The cover-lay films 1-2, such as a polyimide film from which the circuit pattern 1-1 of plurality [FPC / 1st / FPC1 and 2nd FPC2 / top /, such as polyimide film, / base film] and 2-1 are formed, and protect these electrically and mechanically, and 2-2 are formed on the circuit pattern.

[0021] The connection of the circuit pattern for connecting the 1st FPC1 and 2nd FPC2 electrically The connection of the circuit pattern for connecting with said cover-lay film 1-2 on 2-2 By forming the opening 1-3 of the cover-lay film of the almost same magnitude as the part which serves as a connection on said cover-lay film 1-2 and 2-2, and 2-3 The outcrop a circuit pattern 1-1 and for connection of 2-1 was formed, surface treatment of nickel-Au has been performed to the front face, and an electric flow is

performed by the circuit pattern connection 1-4 and 2-4. This opening 1-3, the hole 1-5 which penetrates FPC near 2-3, and 2-5 are formed, and it engages with the positioning shaft 4-1 prepared in two places of the body 4 of a camera, and is positioned on the body 4 of a camera.

[0022] Moreover, the configuration of the connection rubber 3 arranged in the upper part of these 1st FPC1 and 2nd FPC2 is a configuration as shown in drawing 2. In addition, drawing 2 is the side elevation of the connection rubber 3 seen from [of drawing 1] arrow-head A.

[0023] Corresponding to the arranged circuit pattern section by which pressure-welding connection is made, a crevice 3-1 is formed in the core of connection rubber 3 so that it may counter, and it is formed so that deformation of rubber itself may be made easy to the two press sections 3-2 which were able to be distributed to right and left. This press section 3-2 is the width of face L1 of the flat-surface section 3-3 to the width of face L which was able to be distributed. It is formed so that it may become the relation of $L > L1$.

[0024] Like drawing 2, the formed connection rubber 3 is arranged in the upper part of 1st FPC1 and 2nd FPC2, and is pressed with a pressure plate 5. The hole 5-2 when carrying out a bis-stop to the hole 5-1 and the body 4 of a camera which engage with the positioning shaft 4-2 prepared in the body 4 of a camera is formed in the pressure plate 5. after carrying out engagement positioning of the hole 5-1 of a pressure plate 5 first at the positioning shaft 4-2 of the body 4 of a camera -- bis--- 6 -- the body 4 of a camera - - bis--- business -- by carrying out a bis-stop to the self tap hole 4-3, the 1st FPC1 and 2nd FPC2 carry out pressure-welding junction by connection rubber 3, and an electric flow can be aimed at.

[0025] Drawing 3 is drawing where said connection rubber 3 is pressing the circuit pattern 1-1 of 1st FPC1 and 2nd FPC2, and 2-1. The exposed part of 2-4 connects electrically the circuit pattern 1-1 in the 1st FPC1 and 2nd FPC2 connected, and 2-1 with the circuit pattern connection 1-4 in the cover-lay film 1-2, the opening 1-3 of 2-2, and the opening field of 2-3.

[0026] At this time, 2nd FPC2 arranged in the bottom on the basis of the opening 1-3 of a cover-lay film and the opening field of 2-3 is pressed down by connection rubber 3, and is deforming into it. The field 3-3 which connection rubber 3 presses can push the circuit patterns by which the level difference D by the cover-lay film of 1st FPC1 and 2nd FPC2 of 2-4 will interfere in silicone rubber 3 the very thing since a core is mostly pushed on importance with the circuit pattern connection 1-4 smaller than the opening 1-3 of a cover-lay film, and the field of 2-3.

[0027] Thus, connection rubber 3 becomes connectable [a more reliable connector] by making smaller than whole width of face the part which presses a circuit pattern, and making the press by the deformation of connection rubber 3 transmit to a circuit pattern connection completely by the thing of the circuit pattern connection 1-4 and 2-4 for which a core is mostly pushed on importance.

[0028] (Gestalt of the 2nd operation) Drawing 4 shows the gestalt of operation of the 2nd of this invention. The gestalt of this operation shown in drawing 4 is the modification of the configuration of the press section of connection rubber 11.

[0029] The changed part of the configuration of the connection rubber 11 in drawing 4 is only a point of two fields which corresponded to the circuit pattern section arranged so that it might counter, formed the crevice 11-1 in the core of connection rubber 11,

and were able to be distributed to right and left which forms the height 11-2 of R configuration in a core mostly. Other busy conditions and effectiveness are altogether the same as the gestalt of the 1st operation. In addition, since the crevice formed in the connection rubber of the gestalt of the 1st operation and the gestalt of the 2nd operation is the auxiliary section for deforming more smoothly, it is satisfactory even if it constitutes connection rubber, without forming especially.

[0030] (Gestalt of the 3rd operation) Drawing 5 and drawing 6 show the gestalt of operation of the 3rd of this invention.

[0031] The side elevation which drawing 5 expressed the configuration of the connection rubber of this invention best, and was seen from B ** on drawing 6 , and drawing 6 are the perspective views when making pressure-welding connection of FPC using this connection rubber.

[0032] In drawing 5 , 21 is connection rubber and 22 is a pressure plate. Moreover, for 23, as for the 2nd FPC and 25, in drawing 6 , the 1st FPC and 24 are [the body of a camera and 26] screws.

[0033] The connection rubber 21 in the gestalt of this operation has R configuration of the longitudinal direction of this connection rubber 21 which has a core in a center section mostly on the press side of 21-1 which is the field which presses FPC and a printed circuit board, as shown in drawing 5 . It is set up so that the thickness of the core of connection rubber 21 and an edge may change by this. Next, in order to make deformation of connection rubber 21 into homogeneity as much as possible, the pressure plate 22 which presses down this connection rubber 21 is set up so that connection rubber 21 may be covered, and it is set up so that deformation of connection rubber 21 may be pressed down as much as possible with the wall 22-1 which presses down a longitudinal direction, and the wall 22-2 which presses down the direction of a short hand.

[0034] The condition when arranging on FPC the connection rubber 21 set up as mentioned above, and making pressure-welding connection is explained referring to drawing 6 .

[0035] Two or more circuit patterns 23-1 and 24-1 are formed in the 1st FPC23 and 2nd FPC24, the cover-lay film which protects a circuit pattern is arranged in the upper part, the circuit pattern is exposed by the opening 23-2 and 24-2, and an electric flow can be aimed at by carrying out the pressure welding of both.

[0036] The EQC or connection rubber 21 which has the press side 21-1 of R configuration set as smaller magnitude is mostly arranged from the upper part with the magnitude of the opening 23-2 of a cover-lay film, and opening of 24-2 formed at this time. Moreover, the through hole 23-3 corresponding to the positioning shaft 25-1 and the bis-stop hole 25-2 of the body 25 of a camera, 23-4, 24-3, and 24-4 are formed in the 1st FPC23 and 2nd FPC24, respectively; it is positioned and a bis-stop is carried out to the body 25 of a camera.

[0037] After arranging these FPC 23 and 24 and connection rubber 21, a pressure plate 22 is put so that these may be further covered from the bottom. The hole 22-3 formed so that it might correspond also to this pressure plate 22 in the positioning shaft 25-1 and the bis-hole 25-2 of the body 25 of a camera which carried out point **, and 22-4 are formed.

[0038] By carrying out the bis-stop of the components which this locating hole 22-3 is made to engage with the positioning shaft 25-1 of the body 25 of a camera, position,

and are applied to the pressure-welding section on a screw 26, the electrical installation by pressure-welding connection becomes possible. When a bis-stop is carried out, connection rubber 21 is set up so that the load of a core and an edge may become homogeneity more.

[0039] By R configuration which changes the height of the core of connection rubber and an edge as mentioned above being formed, and carrying out a bis-stop from both ends, a load is applied to homogeneity and it becomes possible to raise the dependability of an electric flow of a pressure-welding connection of it.

[0040]

[Effect of the Invention] As explained above, according to this invention, it is effective in it becoming unnecessary for presser-foot members, such as a pressure plate which presses down connection rubber, to also take especially deformation of connection rubber into consideration, and being able to simplify it with a configuration with simple elastic press members, such as connection rubber, while raising the dependability of a pressure-welding connection.

[0041] Moreover, the core of the longitudinal direction of the press side of the connection rubber as an elastic press member which makes pressure-welding connection of FPC, or FPC and a printed circuit board is established for R configuration in top-most vertices. By for example, the thing made to transform connection rubber in presser-foot members, such as a pressure plate which carries out the bis-stop of the both ends Since a press side is formed in respect of one while making the amount of loads to FPC concerning the core and edge of connection rubber itself into homogeneity and raising the dependability of a pressure-welding connection, it becomes possible to make connection rubber from a simpler configuration.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The decomposition perspective view showing the gestalt of operation of the 1st of the connector by this invention.

[Drawing 2] The side elevation of the connection rubber seen from A ** of drawing 1.

[Drawing 3] The sectional view in the condition that the pressure welding of FPC was carried out by the connection rubber in which the gestalt of operation of the 1st of the connector by this invention is shown.

[Drawing 4] Drawing showing the press side of the connection rubber concerning the gestalt of operation of the 2nd of the connector by this invention.

[Drawing 5] Drawing showing the press side of the connection rubber concerning the gestalt of operation of the 3rd of the connector by this invention.

[Drawing 6] The decomposition perspective view of the gestalt of operation of the 3rd of the connector by this invention.

[Drawing 7] The sectional view of the conventional connector.

[Drawing 8] The C-C' sectional view of drawing 7 .

[Description of Notations]

1 -- The 1st FPC 2 -- The 2nd FPC

3 -- Connection rubber 4 -- Body of a camera

5 -- Pressure plate 6 -- Screw

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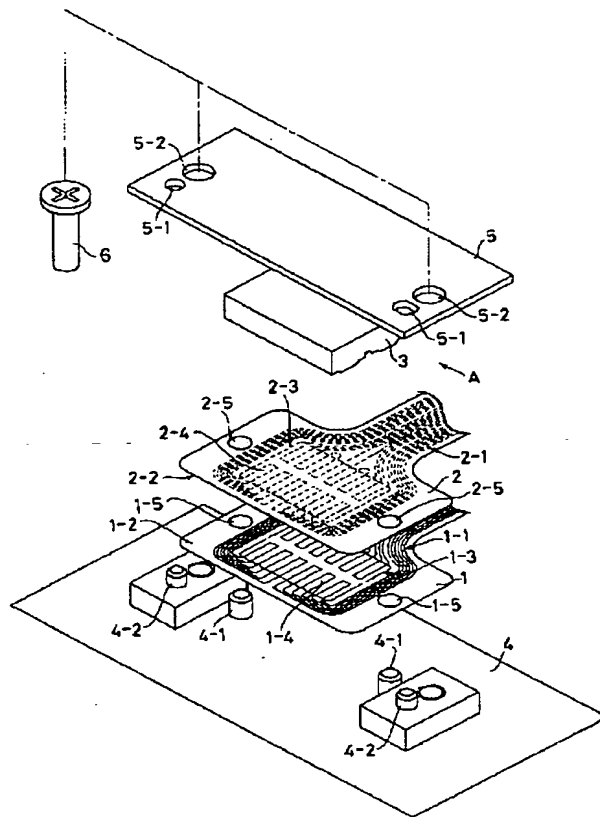
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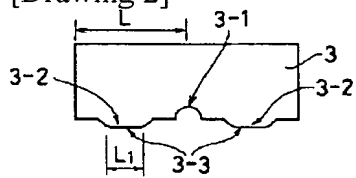
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DRAWINGS

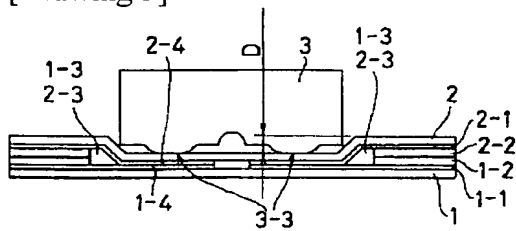
[Drawing 1]



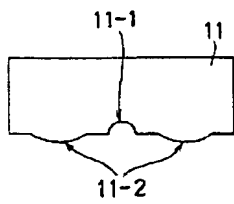
[Drawing 2]



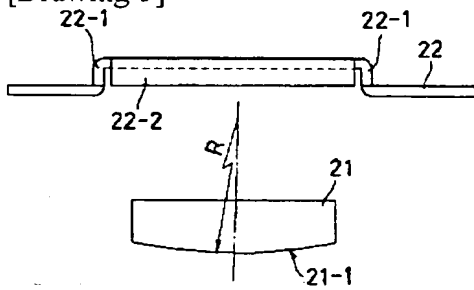
[Drawing 3]



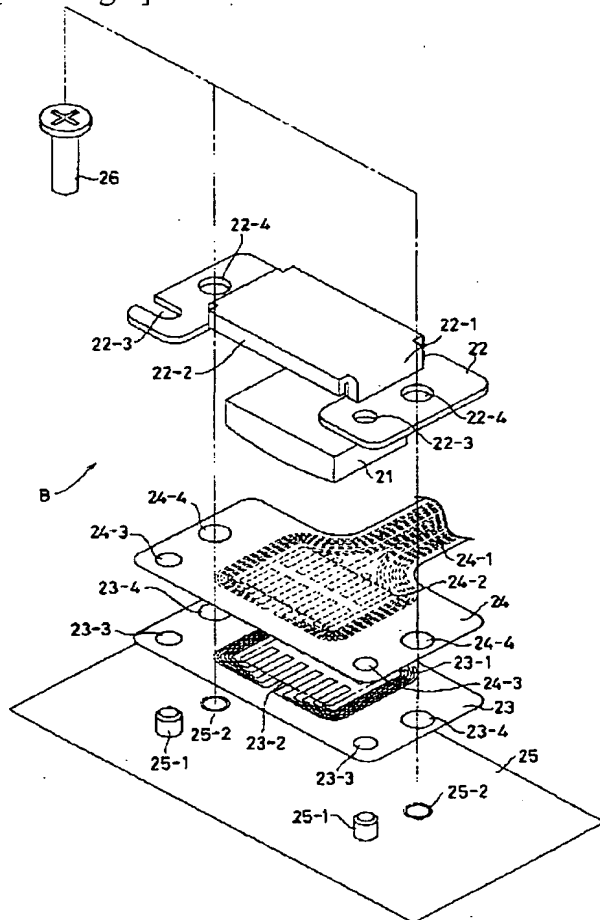
[Drawing 4]



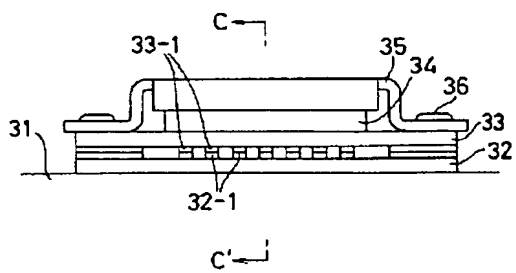
[Drawing 5]



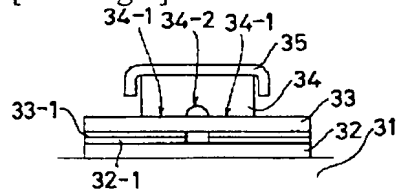
[Drawing 6]



[Drawing 7]



[Drawing 8]



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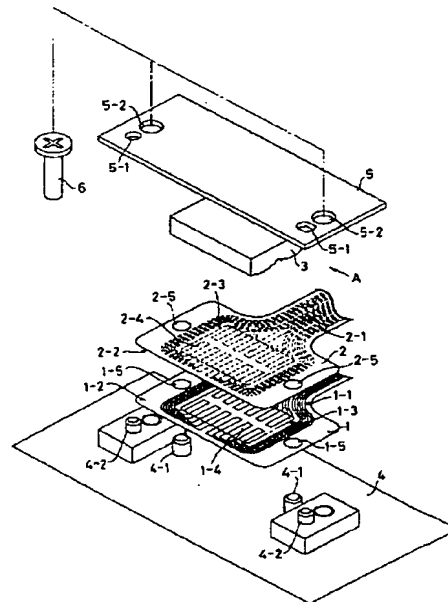
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(54) 【発明の名称】 コネクター

(57) 【要約】

【課題】 配線パターン同士の接触を確実にを行い電気的導通を図ることができるコネクターを提供する。

【解決手段】 フレキシブルプリント基板同士(1、2)もしくは、フレキシブルプリント基板とプリント基板の圧接接続部にあてがわれる弾性部材で形成された弾性押圧部材3と、前記弾性押圧部材3を弾性変形させて該圧接接続部に押圧力を付与する押え部材(4、5、6)とを有し、前記弾性押圧部材3は、所定の押圧力が付与されて弾性変形した前記圧接接続部との押圧面が均一荷重面となるように形成した。



【特許請求の範囲】

【請求項1】 フレキシブルプリント基板同士もしくは、フレキシブルプリント基板とプリント基板の圧接接続部にあてがわれる弾性部材で形成された弾性押圧部材と、前記弾性押圧部材を弾性変形させて該圧接接続部に押圧力を付与する押え部材とを有し、前記弾性押圧部材は、所定の押圧力が付与されて弾性変形した前記圧接接続部との押圧面が均一荷重面となるように形成したことを特徴とするコネクタ。

【請求項2】 請求項1において、前記弾性押圧部材は、弾性押圧部材本体の先端部に押圧面が凸状に形成されていることを特徴とするコネクタ。

【請求項3】 請求項1において、前記弾性押圧部材は、弾性押圧部材本体の先端部に押圧面が全体的に弧形状の凸部を形成したことを特徴とするコネクタ。

【請求項4】 請求項1または2において、前記弾性押圧部材は、当接側に設けられた凹部を境にして押圧面が形成され、少なくともどちらか一方の押圧面が、その分割された押圧面の圧接面が分割された幅よりも小さくなるように形成されたことを特徴とするコネクタ。

【請求項5】 請求項1または2において、前記弾性押圧部材は、当接側に設けられた凹部を境にして押圧面が形成され、少なくともどちらか一方の押圧面に、圧接される配線パターンのほぼ中央部に対応した位置にR形状等の突起部を形成するしたことを特徴とするコネクタ。

【請求項6】 請求項1、2、3、4または5において、前記弾性押圧部材はゴム部材で形成したことを特徴とするコネクタ。

【請求項7】 請求項1、2、3、4、5または6において、前記弾性押圧部材の押圧面は、圧接接続されるフレキシブルプリント基板のカバーレイフィルムの開口部とはほぼ同じ大きさであり、且つ長手方向のほぼ中心部を頂点とするR形状に形成されていることを特徴とするコネクタ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、カメラなどの電子機器に使用されるコネクタであり、特にフレキシブルプリント基板の複数の配線パターンに他のフレキシブルプリント基板もしくはプリント基板の配線パターンを接続するためのコネクタに関するものである。

【0002】

【従来の技術】従来、フレキシブルプリント基板（以下FPCと記す）同士もしくはFPCとハードプリント基板の複数の配線パターンを接続する方法としては、例えばシリコンゴム等の弾性部材を押圧させることに接続する方法があり、図7に従来例として示す。図7は、FPC同士の配線パターンを接続する時の状態を表す断面図である。

【0003】同図において、31はカメラ本体、32は第1のFPC、33は第2のFPC、34はコネクタゴム、35はコネクタゴム34を押圧する押え板、36はビスである。カメラ本体31上に配設される第1のFPC32及び第2のFPC33にはそれぞれ複数の配線パターン32-1と33-1が形成され、それぞれの配線パターン同士が接続されるように整然と配列されている。この上部にはこれら配線パターン32-1と33-1が接続される領域を完全に覆うような大きさに設定されたコネクタゴム34が配設され、このコネクタゴム34に係止・押圧させるように設定された押え板35がかぶせられて、この押え板35をビス36によりカメラ本体31に引きこむことにより、コネクタゴム34が、圧縮され配線パターンを接続させる。

【0004】また、コネクタゴム34は配線パターン32-1及び33-1を押圧させるときに、配線パターン32-1と33-1を完全に覆うとともに断面C-C'である図8に示すように平面の面34-1にて押圧している。

【0005】図8に示される配線パターン32-1と33-1は、この圧接部のほぼ中央部より左右に独立した配線パターンとなり向い合うように配設されているので、配線パターン同士を押圧する領域に対しコネクタゴム34に平面部が形成され、その中央部には、配線パターン部により沿って押すような凹部34-2が形成されている。

【0006】

【発明が解決しようとする課題】しかしながら、上記従来例では弾性体であるシリコンゴムを圧縮して使用しているため、以下のような欠点があった。

【0007】まず第1に、接続させるそれぞれの配線パターンの接触圧を均一にして完全に導通させようとするとシリコンゴムのつぶし量となる変形量を管理することが必要となるが、並列に配列された配線パターンの中心部と端部で図7に示すビス36のビス止め部からの距離が変ることによって押え部材35で押えた時の反発力が変化し且つ平面の面で押すことによりシリコンゴムの反発力が増大され中心部と端部の接触圧が変化して、圧接接続しようとしている配線パターンの導通不良が発生する。

【0008】また、シリコンゴムを押え板35で押え圧縮していく時に、この圧縮力は配線パターン同士を接触させようとする方向への力以外にこの力とは直交する方向である横方向へ逃げていくことで配線パターン中心部と端部の接触圧が変化し、例えば、3枚以上のFPCをコネクタゴムで圧接しようするとFPCの圧接面がカバーレイフィルムや接着剤等により不均一になることで、配線パターンの導通不良が発生しやすい。

【0009】本出願に係る発明の目的は、配線パターン同士の接触を確実に電気的導通を図ることができるコネクタを提供することにある。

【0010】

【課題を解決するための手段】本出願に係る発明の目的を実現する第1の構成は、フレキシブルプリント基板同士もしくは、フレキシブルプリント基板とプリント基板の圧接接続部にあてがわれる弾性部材で形成された弾性押圧部材と、前記弾性押圧部材を弾性変形させて該圧接接続部に押圧力を付与する押え部材とを有し、前記弾性押圧部材は、所定の押圧力が付与されて弾性変形した前記圧接接続部との押圧面が均一荷重面となるように形成したことを特徴とするコネクタにある。

【0011】本出願に係る発明の目的を実現する第2の構成は、上記の第1の構成において、前記弾性押圧部材は、弾性押圧部材本体の先端部に押圧面が凸状に形成されていることを特徴とするコネクタにある。

【0012】本出願に係る発明の目的を実現する第3の構成は、上記の第1の構成において、前記弾性押圧部材は、弾性押圧部材本体の先端部に押圧面が全体的に弧形状の凸部を形成したことを特徴とするコネクタにある。

【0013】本出願に係る発明の目的を実現する第4の構成は、上記の第1または第2の構成において、前記弾性押圧部材は、当接側に設けられた凹部を境にして押圧面が形成され、少なくともどちらか一方の押圧面が、その分割された押圧面の圧接面が分割された幅よりも小さくなるように形成されたことを特徴とするコネクタにある。

【0014】本出願に係る発明の目的を実現する第5の構成は、上記の第1または第2の構成において、前記弾性押圧部材は、当接側に設けられた凹部を境にして押圧面が形成され、少なくともどちらか一方の押圧面に、圧接される配線パターンのはば中央部に対応した位置にR形状等の突起部を形成することを特徴とするコネクタにある。

【0015】本出願に係る発明の目的を実現する第6の構成は、上記の各構成において、前記弾性押圧部材はゴム部材で形成したことを特徴とするコネクタにある。

【0016】本出願に係る発明の目的を実現する第7の構成は、上記の各構成において、前記弾性押圧部材の押圧面は、圧接接続されるフレキシブルプリント基板のカバーレイフィルムの開口部とはほぼ同じ大きさであり、且つ長手方向のはば中心部を頂点とするR形状に形成されていることを特徴とするコネクタにある。

【0017】上記構成において、FPCもしくはハードプリント基板を押す弾性押圧部材としてのコネクタゴムの押圧面は点接触するような面が突出部のような接触部に構成されているので、押え部材にてコネクタゴムを変形押圧した時にまず最初に前記点接触面もしくは突出部が配線パターンを接触させ、ある一定の変形量を越えた時点で、このコネクタゴムの接触面の周辺部が変形、圧縮するように動作する。これにより、最初に配線パター

ンを押す部分は、配線パターン同士が点接触しようとして導通の確実性が向上し且つ押え部材の押し圧力が少なくても導通可能となる。

【0018】また、FPCもしくはハードプリント基板を押す弾性押圧部材としてのコネクタゴムの押圧面は、コネクタゴムの長手方向の中心部を頂点にしてR面が形成されているので、押え部材にてコネクタゴムが変形させられた時、中心部から順次圧力が配線パターンにかかるとともに端部に近づくにつれて例えば押圧部材を取り付けるビス締部近傍であることで、押え部材の圧力が高まって中心部と端部の力のバランスがとれ、均一に配線パターン同士を押すことが可能となり、導通の確実性が向上する。

【0019】

【発明の実施の形態】

（第1の実施の形態）図1から図3は本発明の第1の実施の形態を示す。これらの図において、1は第1のFPC、2は第2のFPC、3はコネクタゴム、4はカメラ本体で、図にはその一部を示す。5は押え板、6はこれら部品をカメラ本体に止めるビスである。

【0020】第1のFPC1と第2のFPC2はポリイミドフィルム等のベースフィルム上に複数の配線パターン1-1と2-1が形成され、これらを電氣的・機械的に保護するポリイミドフィルム等のカバーレイフィルム1-2と2-2が配線パターン上に形成されている。

【0021】第1のFPC1と第2のFPC2を電氣的に接続するための配線パターンの接続部は、前記カバーレイフィルム1-2と2-2上で接続するための配線パターンの接続部は、前記カバーレイフィルム1-2と2-2上で接続部となる箇所にはほぼ同じ大きさのカバーレイフィルムの開口部1-3と2-3を形成することで、配線パターン1-1と2-1の接続用の露出部が形成され、その表面にNi-Auの表面処理を施して、配線パターン接続部1-4と2-4により電氣的導通が行われる。この開口部1-3と2-3の近傍には、FPCを貫通する穴1-5と2-5が形成され、カメラ本体4の2か所に設けられた位置決め軸4-1に係合して、カメラ本体4上に位置決めされる。

【0022】また、これらの第1のFPC1と第2のFPC2の上部に配設されるコネクタゴム3の形状は図2に示すような形状となっている。尚図2は図1の矢印A方向から見たコネクタゴム3の側面図である。

【0023】対向するように配設された圧接接続される配線パターン部に対応してコネクタゴム3の中心部に凹部3-1が形成され、左右に振り分けられた2つの押圧部3-2に対しゴム自体の変形を容易にさせるように形成されている。この押圧部3-2は、振り分けられた幅Lに対し、平面部3-3の幅L₁、が

L>L₁の関係になるように形成されている。

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【0024】図2の如く形成されたコネクタゴム3は、第1のFPC1と第2のFPC2の上部に配設され、押え板5にて押圧される。押え板5には、カメラ本体4に設けられた位置決め軸4-2に係合する穴5-1とカメラ本体4にビス止めする時の穴5-2が形成されており、まず押え板5の穴5-1をカメラ本体4の位置決め軸4-2に係合位置決めした後、ビス6にてカメラ本体4のビス用セルフタッパ穴4-3にビス止めすることで、第1のFPC1と第2のFPC2がコネクタゴム3によって圧接接合し電気的導通が図れる。

【0025】図3は、前記コネクタゴム3が第1のFPC1と第2のFPC2の配線パターン1-1と2-1を押圧している図である。第1のFPC1と第2のFPC2における接続される配線パターン1-1と2-1は、カバーレイフィルム1-2と2-2の開口部1-3及び2-3の開口領域で配線パターン接続部1-4と2-4の露出部分が電気的に接続する。

【0026】この時、カバーレイフィルムの開口部1-3及び2-3の開口領域を基準にして、上側に配設された第2のFPC2がコネクタゴム3に押えられて変形している。コネクタゴム3の押圧する面3-3は、カバーレイフィルムの開口部1-3及び2-3の領域よりも小さく且つ配線パターン接続部1-4と2-4のほぼ中心部を重点に押すようになっているので第1のFPC1と第2のFPC2のカバーレイフィルムによる段差Dにシリコンゴム3自体が干渉されることとなる配線パターン同士を押すことが可能である。

【0027】このようにコネクタゴム3が配線パターンを押圧する部分を全体幅より小さくして配線パターン接続部1-4及び2-4のほぼ中心部を重点に押すこと

【0028】（第2の実施の形態）図4は本発明の第2の実施の形態を示す。図4に示す本実施の形態は、コネクタゴム11の押圧部の形状の変形例である。

【0029】図4におけるコネクタゴム11の形状の変更点は、対向するように配設された配線パターン部に対応し、コネクタゴム11の中心部に凹部11-1を形成し、左右に振り分けられた2つの領域のほぼ中心部にR形状の突起部11-2を形成している点だけである。他の使用状態や効果は第1の実施の形態と全て同じである。なお、第1の実施の形態及び第2の実施の形態のコネクタゴムに形成される凹部は変形をよりスムーズに行うための補助部であるので、特に形成することなくコネクタゴムを構成しても問題はない。

【0030】（第3の実施の形態）図5および図6は本発明の第3の実施の形態を示す。

【0031】図5は、本発明のコネクタゴムの形状を最も良く表し図6上のB視より見た側面図、図6はこのコ

ネクタゴムを使ってFPC同士を圧接接続する時の斜視図である。

【0032】図5において、21はコネクタゴム、22は押え板である。また図6において23は第1のFPC、24は第2のFPC、25はカメラ本体、26はビスである。

【0033】本実施の形態におけるコネクタゴム21は、図5に示すように、FPCやプリント基板を押圧する面である21-1の押圧面上にこのコネクタゴム21の長手方向のほぼ中央部に中心を持つR形状を有する。これによりコネクタゴム21の中心部と端部の厚みが変わるように設定されている。次にこのコネクタゴム21を押える押え板22は、コネクタゴム21の変形をできる限り均一にする為にコネクタゴム21を覆うように設定されていて、長手方向を押える壁22-1と短手方向を押える壁22-2によりコネクタゴム21の変形を極力押えるように設定されている。

【0034】以上のように設定されたコネクタゴム21をFPC上に配置して圧接接続する時の状態を図6を参照しながら説明する。

【0035】第1のFPC23と第2のFPC24には複数の配線パターン23-1と24-1が形成され、その上部に配線パターンを保護するカバーレイフィルムが配設されていて、その開口部23-2と24-2により配線パターンは露出しており、両者を圧接することで電気的導通が図れる。

【0036】この時に形成されるカバーレイフィルムの開口部23-2と24-2の開口部の大きさとほぼ同等か小さめの大きさに設定されたR形状の押圧面21-1を有するコネクタゴム21を上方より配設する。また第1のFPC23及び第2のFPC24にはそれぞれカメラ本体25の位置決め軸25-1とビス止め穴25-2に対応する貫通穴23-3、23-4、24-3、24-4が形成されカメラ本体25に位置決め、ビス止めされる。

【0037】これらFPC23、24とコネクタゴム21を配置後、さらに上側からこれらを覆うように押え板22をかぶせる。この押え板22にも先述したカメラ本体25の位置決め軸25-1とビス穴25-2に対応するように形成された穴22-3及び22-4が形成されている。

【0038】この位置決め穴22-3をカメラ本体25の位置決め軸25-1に係合させて位置決めしビス26にて圧接部に係る部品をビス止めすることで、圧接接続による電気的接続が、可能となる。ビス止めされた時点でコネクタゴム21は、中心部と端部の荷重がより均一になるように設定される。

【0039】以上のようにコネクタゴムの中心部と端部の高さが変わるようなR形状を形成されて、両端よりビス止めさせることで、荷重が均一にかかり、圧接接続部の

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電氣的導通の信頼性を向上させることが可能となる。

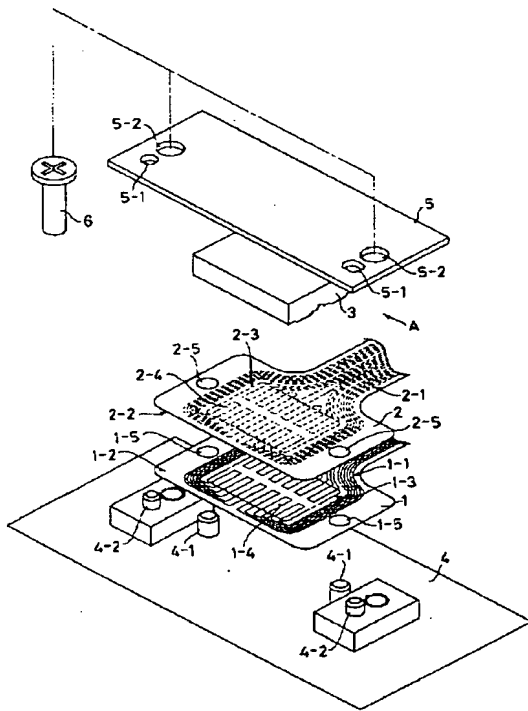
【0040】

【発明の効果】以上説明したように、本発明によれば、コネクタゴム等の弾性押圧部材の簡易な形状により、圧接接続部の信頼性を向上させるとともに、コネクタゴムを押える押え板等の押え部材もコネクタゴムの変形を特に考慮する必要がなくなり簡易化できるという効果がある。

【0041】また、FPC同士もしくはFPCとプリント基板を圧接接続させる弾性押圧部材としてのコネクタゴムの押圧面の長手方向の中心部を頂点にR形状を設けて、例えば両端をビス止めする押え板等の押え部材にてコネクタゴムを変形させることで、コネクタゴム自体の中心部と端部にかかるFPCへの荷重量を均一にして、圧接接続部の信頼性を向上させるとともに、一つの面で押圧面を形成するので、より簡易な形状でコネクタゴムを作ることが可能となる。

【図面の簡単な説明】

【図1】



*【図1】本発明によるコネクタの第1の実施の形態を示す分解斜視図。

【図2】図1のA視よりみたコネクタゴムの側面図。

【図3】本発明によるコネクタの第1の実施の形態を示すコネクタゴムによりFPC同士が圧接された状態の断面図。

【図4】本発明によるコネクタの第2の実施の形態に係るコネクタゴムの押圧面を示す図。

【図5】本発明によるコネクタの第3の実施の形態に係るコネクタゴムの押圧面を示す図。

【図6】本発明によるコネクタの第3の実施の形態の分解斜視図。

【図7】従来のコネクタの断面図。

【図8】図7のC-C'断面図。

【符号の説明】

1…第1のFPC

2…第2のFPC

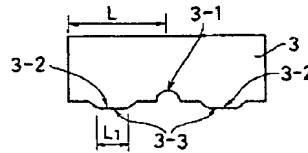
3…コネクタゴム

4…カメラ本体

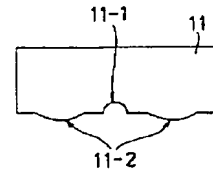
5…押え板

6…ビス

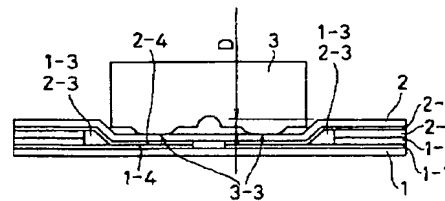
【図2】



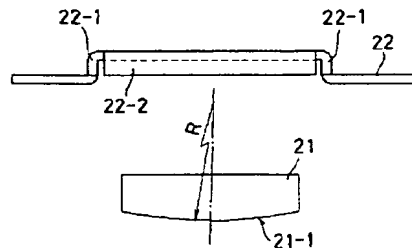
【図4】



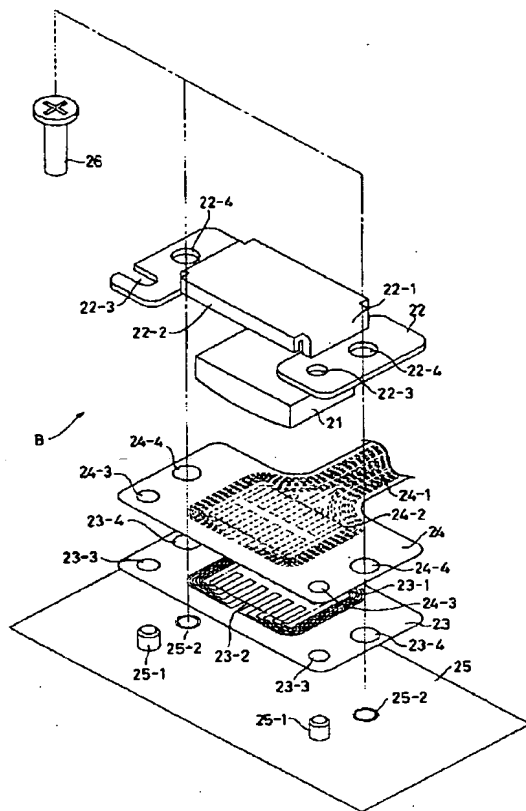
【図3】



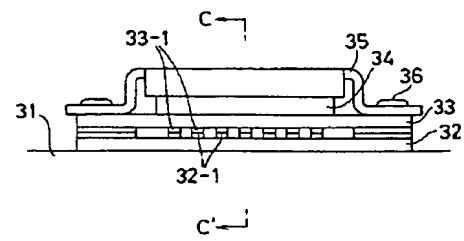
【図5】



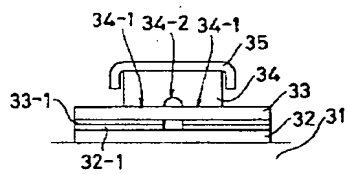
【図6】



【図7】



【図8】



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